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AUTHOR Nelson, Orville
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ABSTRACT

A study examined the extent to which microcomputers were used in high school industrial arts courses and assessed the types of inservice experiences and instructional materials needed to expand such usage. To gather data for the study, the researcher mailed surveys to a random sample of 200 junior high school and high school industrial arts departments across the country. A second round of survey instruments was sent to a new sample of industrial arts departments. Response rates to the first and second rounds were 70 and 43 percent respectively. A follow-up telephone survey was then conducted to verify the response rate of the second survey. Based on these data collection efforts, it was concluded that industrial arts teachers were making little use of computers and microcomputers in their courses; however, comments on the surveys indicated a growing interest in including microcomputers in industrial arts courses. After analyzing the factors that were mentioned as encouraging and discouraging microcomputer usage in industrial arts courses, the researcher recommended the following items to encourage the use of computers and microcomputers: additional funding, software that is designed specifically for industrial arts courses and a clearinghouse to aid in the procurement of such software, access to inservice and college courses on the use of computers in industrial arts courses, and technical assistance to help teachers with specific problems encountered in preparing software and instructional materials. (Both survey instruments are appended to this report.) (MN)

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# NATIONAL SURVEY OF INDUSTRIAL ARTS TEACHERS' IN-SERVICE AND INSTRUCTIONAL MATERIALS NEEDS FOR USING MICRO-COMPUTERS IN THEIR COURSES

Research Project Funded

by

The American Council on Industrial Arts Teacher Education

Conducted by

Orville Nelson
School of Industry and Technology
University of Wisconsin-Stout

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Abstract

The purpose of this study was to identify the extent to which micro-computers were used in high school industrial arts courses and to determine the types of in-service experiences and instructional materials needed to expand this usage.

Major objectives of this study were to: (a) determine the types of micro-computer applications being made in industrial arts content areas, (b) identify common problems encountered by industrial arts teachers who were using micro-computers and (e) determine the types of in-service experiences needed.

A basic survey research design was used to gather the information for this study. A random sample of junior and senior high school industrial arts teachers was acquired from Market Data Research. Two mail surveys and one telephone survey were conducted. The first mail survey was used to identify the types of computer applications being made by high school industrial arts teachers and the problems they encountered. These teachers were also asked to identify the types of resources they needed to make additional use of computers. Responses to the first survey were used to develop the second survey instrument. This was sent to a random sample of junior and senior high school industrial arts teachers. A follow-up telephone survey was done to determine the representativeness of the responses to the second survey.

Major findings of the study were:

- Industrial arts teachers were making little use of computers and micro-computers in their courses. However, comments to the surveys indicated a growing interest in including micro-computers in industrial arts courses.
- Major factors that encouraged computer usage were:
  - * Increasing use of computers in industry
  - * Increasing student and teacher interest in computers

* The availability of computer equipment and software
* Access to college courses, workshops and/or in-service on micro-computers

- Factors that discouraged the use of micro-computers included:

  * Teachers' lack of skill in writing programs
  * Lack of money
  * Lack of software that could be used in industrial arts courses
  * Inadequate access to computer equipment

- Additional assistance that was needed to increase the use of micro-computers emphasized.

  * Additional funding
  * Software specifically designed for industrial arts courses and a software clearinghouse which would make it easy to obtain software
  * Additional computer equipment in the industrial arts laboratory
  * Access to in-service and college courses on the use of computers in industrial arts courses
  * Curriculum materials which would help to infuse computer applications in industrial arts courses
  * Adequate time for the teacher to prepare software and instructional materials
  * Technical assistance to help with specific problems

## Introduction

One of the major goals of industrial arts is to expand students' knowledge and understanding of industry and the technology it uses. Computers comprise one of the fastest-growing, if not the fastest, areas of technology in industry. Some labor market analysts are projecting almost all workers will use a computer to some extent in their work by 1990.

Signs of these changes are abundant. A brief review of a daily newspaper or weekly periodical usually turns up one or more articles on new applications of computers and micro-computers in industry. A review of technical journals uncovers even more articles and examples of applications. The September 1982 issue of the Scientific American devoted to mechanization of work describes the relentless process of seeking more efficient ways to do work and the increasing involvement of computers in this effort.

This researcher has talked with industrial arts teachers in a number of states. It is apparent from these conversations that the innovators in industrial arts are working with micro-computers. During the 1983-84 school year there was a significant growth in interest on the part of industrial arts teachers in general concerning applications of micro-computers in their courses. However, little was known about the applications that had been made and even less was known about the types of in-service and instructional materials industrial arts teachers needed in order to make effective use of micro-computers in their courses.

Industrial arts teachers are the key to rapid and effective infusion of computer technology in industrial arts courses. Without adoption of this new technology, the content of industrial arts courses will lag behind that used in industry. Moreover, industrial arts course content will become less appealing to students. Students are attracted to computers and will enroll in those courses that use them.

This project was designed to gather information related to the extent micro-computers were used in high school industrial arts courses. This information will help to keep the content of industrial arts courses current with the technology used in industry.

## Problem

The purpose of this study was to identify the extent to which micro-computers were used in high school industrial arts programs and determine the types of in-service experiences and instructional materials needed to expand this usage.

## Objectives

The following objectives guided this study. This project:

1. Determined the current micro-computer applications being made in each of the industrial arts content areas.
2. Indentified the common problems encountered by industrial arts teachers using micro-computers.
3. Determined the types of in-service experiences which would be most helpful for industrial arts teachers who wish to utilize micro-computers.
4. Identified the need for student learning materials.

## Research Approach

Since the purpose of this study was to identify the level of computer usage that existed in junior and senior high school industrial arts programs, a basic descriptive research design was used. A representative, national sample of industrial arts teachers was selected and surveyed to identify the level of computer usage, problems encountered in adding computers to industrial arts programs, and types of resources needed to make more effective use of computers. The survey procedures utilized were modeled on the Delphi Technique. The sample and survey methodology are described in more detail in the sections that follow.

## Populations and Samples

The populations for this study were junior and senior high school industrial arts teachers in the United States. Teachers from all 50 states were included in the population. Market Data Research provided mailing labels for randomly-selected samples of junior and senior high school industrial arts departments. These labels were coded by Market Data Research so that the level of the program, junior or senior high school, could be identified on the label.

Since a minimum number of labels had to be ordered, Market Data provided more than enough address labels for this study. When specific samples were selected for each phase of the survey, a sequential sampling process was used. For example, if 20 percent of the labels were needed, every fifth label from the computer label sheets was selected.

## Survey Instrument Design Procedures

Since there was no prior knowledge of the factors which discouraged and encouraged the use of computers in industrial arts classes and the types of assistance needed in order to make more effective use of micro-computers, it was decided to use a modification of the Delphi Technique to develop the survey instruments (Nelson, 1982). The Delphi Technique is a process for collecting a variety of projections about the future and developing consensus on these projections. The purpose of this study was not to project future trends; however, the process used in the Delphi Technique provided an appropriate model for the design of the survey process.

The survey process was conducted in two stages. In the first stage, the industrial arts teachers contacted were asked to identify how micro-computers were used in their courses, factors that inhibited use, factors

that encouraged their use, and the additional resources/assistance that would be needed to expand the use of micro-computers in their courses. A sample of this survey instrument is included in Appendix A.

An excellent response was received to this first survey. Approximately 70 percent of those contacted responded. Individual comments from each survey return were typed on 3 x 5 cards. These cards were then sorted into unique statements or concepts. Each concept formed the basis of an item in the second survey.

Once all the statements for the second round survey had been written they were placed in a logical sequence. Items referring to like applications, needs or problems were grouped together. At this point a review of the number of items indicated that it was not feasible to use them in one survey instrument. The resulting survey would have been too long to have secured an adequate response rate. To overcome this problem the matrix sampling technique (Lord and Novick, 1968) was applied to create two survey instruments. One survey instrument contained the items on factors that encouraged the use of micro-computers and the resources needed to expand their use. The second survey instrument contained the questions on the types of computer applications made and factors that discouraged the use of micro-computers. A copy of these two survey instruments is included in Appendix B.

Survey Process

The first survey was mailed to a sample of 200 Junior and Senior High School Industrial Arts Departments in November, 1983. The person receiving the survey was instructed that it could be completed by the department or by him/her. As noted previously, the purpose of the first survey was to identify factors that encouraged and discouraged the use of micro-computer and the types of applications being made.

A good response was received to this survey. Completed surveys continued to be returned through December and well into January. In fact, a few were returned in February. Early in January the responses to the first survey were typed on 3 x 5 cards. This information was used to develop the second round survey.

The second round survey was mailed during the last week of January, 1984. A new sample of industrial arts departments was selected for the second round. In other words, persons who responded to the first round did not receive the second survey. This reduced the amount of response time requested form any one participant. It also provided a way of cross validating the results.

Response rates to the second survey were typical of a national survey. Overall the response rate was 43 percent of the total potential responses. However, this rate may underestimate somewhat the actual response rate. There was no way to control for high schools or junior high schools which did not have industrial arts departments. It is likely that this problem manifested itself primarily at the junior high school level.

In order to check on non-respondent biases in the data, a telephone survey was conducted. Twenty-five industrial arts departments were contacted and asked to identify their level of computer usage and the two major factors which most inhibited and encouraged their used of computers. The results of this telephone survey were contrasted with the mail survey results. In addition, the response patterns observed from the first survey were contrasted with those on the second survey. Based on these comparisons it was concluded that the results from the second survey were representative of the status of the computer usage in industrial arts courses.

## Results

Responses to the objective portion of the survey were processed by computer. Written comments were read and synthesized. A summary of the findings follows.

## Degrees Held

The highest degree held by the respondents is given in Table One. Slightly more than one-half of the participants had a master's or higher graduate degree. Incomparison, 55.5 percent of industrial arts teachers were reported to have a bachelor's degree or less in a report of the Standards for Industrial Arts Project (Dugger, 1980, p. 118). Thus, the respondents to this survey have a slightly higher education level than industrial arts teachers in general.

## Computer Useage

Very little use is made of computers in industrial arts classes. (See Table Two.) A large majority (70 percent) of industrial arts teachers reported no useage. Only two teachers said they were making moderate to extensive use. During the telephone interviews concerned with the level of use, however, several of the teachers noted that they were planning to acquire a micro-computer or CAD system. Thus, there appeared to be growing interest in micro-computers and related systems.

The most common type of computer used was a micro-computer. (See Table Three.) A few were using mini-computers and time-sharing systems. Apple was the most common make of computer used. (See Table Four.) Commodore and Radio Shack were the next most common.

A comparison of the "no use" percentages in Tables Two, Three, and Four reveal some discrepancies. Most of these differences can be accounted

TABLE 1

Highest Degree Held by IA Teachers

| Highest Degree | Results | |
|---|---|---|
| | N | % |
| Bachelor's Degree | 54 | 45 |
| Master's | 56 | 47 |
| Education Specialist Degree | 5 | 4 |
| Doctor's Degree | 2 | 2 |
| Other | 4 | 3 |
| Omit | 4 | 3 |
| TOTAL | 125# | 104# |

#Some persons marked two responses.

for by the difference in questions. The question for Table Two asked for classroom applications for students. The other two questions did not. Some teachers indicated in the first survey and the telephone interviews that they were using a computer for their class records and test scoring but did not have enough equipment to expose their students to computer technology.

Computer Applications

Developing computer literacy and performing calculations, such as ohms law and board feet, are the most common applications of micro-computers in industrial arts. (See Table Five.) The next most common uses were to assist in developing problem solving skills and shop management. On these items, the average response reflected a slight to moderate useage.

TABLE 2

Extent To Which Computers Are Used In Industrial Arts Classes

| Extent of Use | Results | | | | | |
|---|---|---|---|---|---|---|
| | Jr. High | | Sr. High | | Total | |
| | N | % | N | % | N | % |
| No Use | 18 | 72 | 19 | 70 | 38 | 70 |
| Slight - Used for a brief period of time in one or two courses to demonstrate applications. | 5 | 20 | 7 | 26 | 13 | 24 |
| Moderate - Students have a chance to use a computer or terminal for 2 to 4 weeks in selected IA courses. | 0 | 0 | 1 | 4 | 1 | 2 |
| Extensive - Students use a computer or terminal for most of the school term in several of our IA courses. | 1 | 4 | 0 | 0 | 1 | 2 |
| Very Extensive - Students use a computer or terminal as a regular part of class activities in almost all IA courses. | 0 | 0 | 0 | 0 | 0 | 0 |
| Omit | 1 | 4 | 0 | 0 | 1 | 2 |
| TOTAL | 25 | 100 | 27 | 100 | 54 | 100 |

Computers were also used to acquire career information, individualize instruction, and run simulations. Teachers also used them to develop students' programming skills, CAD, and graphic arts activities.

With the exception of graphic arts applications, senior high school teachers made more extensive use of computers. This was especially true in the area of developing programming skills.

TABLE 3

Type of Computer Used

| Type of Computer | Results | |
|---|---|---|
| | N | % |
| Micro-Computer | 42 | 35 |
| Mini-Computer | 5 | 4 |
| Main Frame | 0 | 0 |
| Time Sharing System | 3 | 3 |
| Omit (Usually indicated no computer was used) | 72 | 60 |

NOTE: Some respondents checked two responses. Thus, the N and % total more than the sample size and 100% respectively.

TABLE 4

What Make Of Computer Are You Using?

| Make | Results | |
|---|---|---|
| | N | % |
| Apple | 37 | 31 |
| Atari | 5 | 4 |
| Commodore | 13 | 11 |
| IBM PC | 1 | 1 |
| Radio Shack | 10 | 8 |
| Zenith | 2 | 2 |
| Other | 1 | 1 |
| Omit (Usually indicated no computer was used) | 64 | 53 |

NOTE: Some respondents checked two responses. Thus, the N and % total more than the sample size and 100% respectively.

Table 5

Applications of Micro-Computers Made
by Those Using a Computer

| Rank | Computer Applications | Results | | | | | |
|---|---|---|---|---|---|---|---|
| | | Total | | Jr. High | | Sr. High | |
| | | $\bar{X}$ | SD | $\bar{X}$ | SD | $\bar{X}$ | SD |
| 1.5 | Perform calculations (Ohms law, board feet, feed and speeds, etc.). . . . . | 2.4# | 1.2 | 1.4 | .9 | 3.0 | 1.0 |
| 1.5 | Develop computer literacy including the basic skills needed to operate a computer. . . . . | 2.4 | 1.0 | 2.0 | 1.4 | 2.5 | .7 |
| 3.5 | Lab or shop management (grades, inventory, records, etc.) . . . . . | 2.1 | .9 | 1.6 | .9 | 2.2 | .7 |
| 3.5 | Tool to assist in developing problem-solving skills. | 2.1 | 1.0 | 2.0 | 1.0 | 2.4 | .9 |
| 6 | Acquire and search career information. . . . . | 1.9 | 1.2 | 1.8 | 1.3 | 1.9 | 1.1 |
| 6 | Individualize instruction (includes computer-assisted instruction--CAI) . . . . . | 1.9 | 1.0 | 1.6 | .9 | 2.2 | 1.1 |
| 6 | Run simulations. . . . . | 1.9 | .9 | 1.8 | .8 | 2.2 | .8 |
| 8 | Develop students' programming skills . . . . . | 1.8 | .9 | 1.2 | .5 | 2.2 | 1.0 |
| 9.5 | Computer-aided drafting and design (CAD, etc.) . . | 1.7 | 1.2 | 1.6 | 1.3 | 1.9 | 1.3 |
| 9.5 | Graphic Arts - typesetting, text formatting, etc . | 1.7 | 1.2 | 2.2 | 1.6 | 1.6 | 1.0 |
| | Number | 15* | | 5* | | 9* | |

# Means are based on the following response scale.

1 = NO = Do not use. 3 = SU = Some use.
2 = PU = Preparing to use. 4 = EU = Extensive use (Primary or major component of a course).

* This analysts is based on those who are using a micro-computer.
One person using a micro-computer did not indicate grade level.

It should be emphasized that the means in Table Five are based on responses from teachers who are using computers. This was a relatively small number of those who responded.

Factors that Encourage Computer Useage

Increasing use of computers in industry was the most important factor that encouraged more utilization of computers in industrial arts. (See Table Six.) Teacher and student interest were also major factors. The availability of computer equipment in the industrial arts lab ranked fourth and the average response indicated that this factor had "some" to "much" influence. Comments made by industrial arts teachers during the telephone interviews reinforced the importance of direct access to equipment.

In-service sessions, workshops, and college courses had an influence on computer useage. Articles in professional journals and encouragement from school administrators were also helpful. Availability of appropriate software had an influence on useage. The teacher's ability to write programs had slight influence. Grants, gifts and free loans of equipment had little influence. However, when federal or state grants were available they had a major impact. Several respondents to the first survey commented that a grant of federal or state funds for computer equipment had made a major difference.

For the most part the response patterns for junior and senior high school industrial arts teachers were the same. Student interest was a more important factor in junior high school and industry useage was slightly more important at the high school level. Junior high school teachers reported more encouragement from their administrators. Also, junior high teachers wrote more programs and grants.

TABLE 6

Factors That Encourage Computer Usage
In Industrial Arts Courses

| Rank | Factors Encouraging Use of Computers | Results | | | | | |
|---|---|---|---|---|---|---|---|
| | | Total | | Jr. High | | Sr. High | |
| | | $\bar{X}$ | S.D. | $\bar{X}$ | S.D. | $\bar{X}$ | S.D. |
| 1 | Increasing use of computers in industry. . . . . | 2.7* | .6 | 2.6 | .7 | 2.8 | .5 |
| 2 | My interest in computers. . . . . | 2.5 | .7 | 2.6 | .5 | 2.4 | .8 |
| 3 | Student interest. . . . . | 2.4 | .8 | 2.8 | .7 | 2.3 | .8 |
| 4 | Availability of computer equipment in our lab/shop . . . . . | 2.3 | .8 | 2.3 | .9 | 2.3 | .8 |
| 5 | Courses, workshops, or in-service provided by a college or university. | 2.1 | .6 | 2.1 | .6 | 2.0 | .6 |
| 7 | Articles in professional journals. | 2.0 | .6 | 2.1 | .6 | 2.0 | .6 |
| 7 | Encouragement from the administration of my school. . . . . | 2.0 | .9 | 2.4 | .7 | 1.8 | .9 |
| 7 | Availability of appropriate software (programs). . . . . | 2.0 | .7 | 2.0 | .8 | 2.0 | .7 |
| 9 | Workshops, meetings, programs, etc. provided by our state department of education . . . . . | 1.9 | .7 | 2.0 | .8 | 1.8 | .6 |
| 10 | My ability to write programs. . . | 1.7 | .9 | 2.0 | .9 | 1.6 | .8 |
| 11.5 | Grant of funds from federal, state, or other agencies or organizations for computer equipment and software . | 1.6 | .8 | 1.9 | .9 | 1.4 | .7 |
| 11.5 | Encouragement and help given by another industrial arts teacher . | 1.6 | .7 | 1.6 | .5 | 1.6 | .8 |
| 13 | Gift, grant, or free loan of computer equipment and software. . . . . | 1.5 | .9 | 1.8 | 1.0 | 1.4 | .8 |
| | Number | 54 | | 25 | | 27 | |

*KEY: 1 = NO = No influence, 2 = SI = Some influence, 3 = MI = Much influence

Factors that Discourage Useage

Lack of skill in writing computer programs was identified as the major barrier. (See Table 7.) The average response on this item identified this as a major negative factor. Four factors tied for the next most critical; lack of funds, insufficient software for IA, lack of skill in using a computer, and inadequate acccess to computers. These four factors had mean responses of 2.2 which reflect "some" to "major" negative impacts.

Insufficient time and lack of appropriate space in the lab were identified as having negative impacts. Lack of administrative support and short periods were not significant problems.

Response patterns for junior and senior high school teachers were similar.

Additional Assistance Needed

A variety of resources that would facilitate increased use of computers is listed in Table 8. Additional funds and software designed for industrial arts were identified as very important. The importance of software was apparent in two other resources that were rated important. A software clearing house and time to develop software had means in the important range. Additional computer equipment was also rated in the important range.

Access to curriculum materials and courseware were identified as important. Time to develop these was also given an important rating.

College courses and in-service related to computer useage received mean ratings in the important range. Technical assistance was also given an important rating.

On most items, responses of junior and senior high school teachers were similar. Junior high school teachers placed more emphasis on curriculum guides and adequate space for computers. Junior high school teachers also noted more need for software and time to develop software and course materials.

Table 7

Factors that Hamper or Discourage the
Use of Micro-Computers in Industrial Arts

| Rank | Factors that Hamper or Discourage the Use of Micro-Computers | Results | | | | | |
|---|---|---|---|---|---|---|---|
| | | Total | | Jr. High | | Sr. High | |
| | | $\bar{X}$ | SD | $\bar{X}$ | SD | $\bar{X}$ | SD |
| 1 | I lack skill in writing computer programs. . . . . | 2.5# | .7 | 2.5 | .7 | 2.5 | .6 |
| 3.5 | Lack of funds to purchase hardware and software. . . | 2.2 | .8 | 2.2 | .8 | 2.2 | .8 |
| 3.5 | Appropriate software is <u>not</u> available for ind. arts. | 2.2 | .7 | 2.3 | .7 | 2.1 | .8 |
| 3.5 | I do <u>not</u> have enough skill in using a computer . . . | 2.2 | .8 | 2.2 | .9 | 2.1 | .8 |
| 3.5 | Our industrial arts program does <u>not</u> have access to enough computers . . . . . | 2.2 | .9 | 2.3 | .8 | 2.1 | .9 |
| 6 | Our industrial arts lab(s) does <u>not</u> have an appropriate area for micro-computers (dust free,etc.) | 2.1 | .9 | 2.3 | .8 | 2.1 | .9 |
| 7 | Time--I do <u>not</u> have enough time to prepare for using a computer in my classes . . . . . | 2.0 | .8 | 2.0 | .8 | 2.1 | .7 |
| 8 | Our administration is <u>not</u> supportive of computers for industrial arts. . . . . | 1.7 | .8 | 1.5 | .7 | 1.8 | .8 |
| 9 | Short class periods make it difficult to make effective use of computers . . . . . | 1.5 | .7 | 1.4 | .7 | 1.6 | .7 |

<u>Other</u>: Seven people commented - Several of the comments reinforced the factors listed above especially the lack of funds and availability of computers. Another frequent comment was "computers are taught in another department."

| | | | |
|---|---|---|---|
| Number | 64* | 35* | 30* |

# Means are based on the following scale:

1 = NO = No influence
2 = SI = Some negative impact
3 = MI = Major negative impact (major deterrent to using computers in my industrial arts classes)

* Three people checked both levels and two omitted the item.

TABLE 8

Additional Assistance IA Teachers Need In Order To Increase Their Use of Computers

| RANK | Changes/Resources Needed to Expand Use of Computers in Industrial Arts Classes | Results | | | | | |
|---|---|---|---|---|---|---|---|
| | | Total | | Jr. High | | Sr. High | |
| | | $\bar{X}$ | S.D. | $\bar{X}$ | S.D. | $\bar{X}$ | S.D. |
| 1.5 | Additional funds. . . . . | 3.5* | .8 | 3.5 | .5 | 3.5 | .9 |
| 1.5 | Software (programs) designed for industrial arts . . . . . | 3.5 | .8 | 3.7 | .7 | 3.4 | .8 |
| 3.5 | Additional computers and peripheral equipment . . . . . | 3.2 | .9 | 3.2 | .8 | 3.3 | .8 |
| 3.5 | User's group or clearinghouse of software for industrial arts courses(i.e., source of information on available software) . . . . . | 3.2 | .8 | 3.5 | .6 | 3.1 | .9 |
| 6.5 | Time--to develop software for our courses. | 3.1 | .9 | 3.3 | .8 | 2.9 | .9 |
| 6.5 | Appropriate courseware for computer applications (includes textbooks, student workbooks, etc.). . . . . | 3.1 | .9 | 3.4 | .7 | 3.0 | .9 |
| 6.5 | Encouragement and support of our school administration . . . . . | 3.1 | .9 | 3.1 | .9 | 3.1 | .9 |
| 6.5 | In-service opportunities to improve my knowledge and skills for using computers. | 3.1 | .9 | 3.1 | .9 | 3.0 | .9 |
| 10 | Time--additional time to plan and develop instructional materials related to computer applications . . . . . | 3.0 | .9 | 3.2 | .9 | 2.9 | .9 |
| 10 | Technical assistance--access to someone who could answer my questions when I run into a problem. . . . . | 3.0 | .8 | 3.2 | .7 | 2.9 | .8 |
| 10 | College courses that would improve my knowledge and skills for using computers. | 3.0 | .9 | 3.1 | .8 | 2.8 | .9 |
| 11.5 | Curriculum guide(s) that would describe how computers fit into the industrial arts curriculum . . . . . | 2.9 | 1.0 | 3.3 | .8 | 2.8 | 1.1 |
| 11.5 | Appropriate space to house computers in our lab/shop . . . . . | 2.9 | 1.0 | 3.2 | .9 | 2.6 | .9 |
| | Number | 54 | | 25 | | 27 | |

*KEY: 1 = NI = Not important, 2 = SI = Slightly important, 3 = MI = Moderately importa
4 = VI = Very important (would be essential to increasing my usage)

## Summary

Industrial arts teachers made little use of computers in their courses. A variety of factors influenced this situation.

Although computers were not a common piece of equipment in the industrial arts lab, many IA teachers indicated an interest in expanding their use. Based on the responses to the surveys, it would appear that industrial arts teacher education departments could have a significant impact on the integration of micro-computers in industrial arts courses. One or more of the following would provide significant assistance to IA teachers.

- Offer courses on computer operation, software selection and computer applications.
- Offer courses on using common software such as spread sheets, word processing and graphics; and specialized software, such as CAD, in industrial arts classes.
- Provide access to courses that develop basic programming skills for those who are interested.
- Develop specialized software and courseware for industrial arts courses and provide a clearinghouse or newsletter to inform teachers of the availability of the software.
- Provide technical assistance to help industrial arts teachers with their computer problems.
- Assist high schools with their in-service programs.

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Appendix A

Round One
Survey Instrument

Industrial Arts Micro-Computer Survey

Directions: For each question, write the two or three responses that come to mind first. It is not necessary to write long responses.

1. How do you use micro-computers in your industrial arts classes? (If you are not using a micro-computer, write "none" and go on to question 3.)

2. What has encouraged or helped you to use micro-computers in your industrial arts classes?

3. What has discouraged or hampered the use of micro-computers in your Industrial arts classes?

4. What additional assistance, equipment, instructional, etc. do you need in order to make more use of micro-computers in you industrial arts classes?

Thank you. Please return to: Orville Nelson
218 Applied Arts
UW-Stout
Menomonie, WI 54751

# Appendix B

## Round Two
## Survey Instruments

# INDUSTRIAL ARTS COMPUTER SURVEY

DIRECTIONS: This survey has designed so you can circle or check most of your responses. Place your responses on this survey. If you have any questions regarding this survey, please contact or call me. (715-232-1382)

## A. Current Applications.

The questions in this section are concerned with current application of microcomputers in your courses. Follow the instructions given.

1. Do you presently use a computer in your industrial arts classes?

____(1) No. -- Please go to Question 13.

____(2) Yes -- Please go to Question 2.

2-12. Several general applications or uses of a computer are listed in the left column. Circle the response that best indicates your current usage for each application. Use the following responses.

1 = NO = Do not use.
2 = PU = Preparing to use.
3 = SU = Some use.
4 = EU = Extensive use (primarily or major component of a course).

| COMPUTER APPLICATIONS | Level of Use NO 1 | PU 2 | SU 3 | EU 4 |
|---|---|---|---|---|
| 2. Acquire and search career information. . . . . | 1 | 2 | 3 | 4 |
| 3. Perform calculations (Ohms law, board feet, feed and speeds, etc.). . . . . | 1 | 2 | 3 | 4 |
| 4. Develop computer literacy including the basic skills needed to operate a computer. . . . . | 1 | 2 | 3 | 4 |
| 5. Computer-aided drafting and design (CAD, etc.) . . | 1 | 2 | 3 | 4 |
| 6. Individualize instruction (includes computer-assisted instruction--CAI). . . . . | 1 | 2 | 3 | 4 |
| 7. Lab or shop management (grades, inventory, records, etc.). . . . . | 1 | 2 | 3 | 4 |
| 8. Run simulations. . . . . | 1 | 2 | 3 | 4 |
| 9. Tool to assist in developing problem-solving skills. . . . . | 1 | 2 | 3 | 4 |
| 10. Develop students' programming skills. . . . . | 1 | 2 | 3 | 4 |
| 11. Graphic Arts - typesetting, text formatting, etc. . | 1 | 2 | 3 | 4 |
| 12. Other _____ | 1 | 2 | 3 | 4 |

B. Factors that Discourage the Use of Micro-Computers.

The column on the left contains a number of factors that may discourage or hamper the use of micro-computers in your industrial arts classes. Please indicate the extent to which each factor discouraged the use of micro-computers. Use the following responses.

1 = NO = No influence  2 - SI = Some negative impact

3 = MI = Major negative impact (major deterrent to using computers in my industrial arts classes)

| FACTORS THAT HAMPER OR DISCOURAGE THE USE OF MICRO-COMPUTERS | Degree of Impact NO 1 | SI 2 | MI 3 |
|---|---|---|---|
| 13. Lack of funds to purchase hardware and software. . . | 1 | 2 | 3 |
| 14. Appropriate software is not available for ind. arts. | 1 | 2 | 3 |
| 15. I lack skill in writing computer programs. . . . . | 1 | 2 | 3 |
| 16. I do not have enough skill in using a computer. . . | 1 | 2 | 3 |
| 17. Time--I do not have enough time to prepare for using a computer in my classes. . . . . | 1 | 2 | 3 |
| 18. Our industrial arts lab(s) does not have an appropriate area for micro-computers (dust free, etc.). . . . . | 1 | 2 | 3 |
| 19. Our administration is not supportive of computers for industrial arts. . . . . | 1 | 2 | 3 |
| 20. Our industrial arts program does not have access to enough computers. . . . . | 1 | 2 | 3 |
| 21. Short class periods make it difficult to make effective use of computers . . . . . | 1 | 2 | 3 |
| 22. Other_____ | 1 | 2 | 3 |
| 23. Other_____ | 1 | 2 | 3 |

C. Additional Assistance Needed to Increase the Use of Computers.

Read each of the statements below and indicate how important each would be to increasing the use of computers in your industrial arts classes. Use the following responses.

1 = NI = Not Important
2 = SI = Slightly Important
3 = MI = Moderately Important
4 = VI = Very Important (would be essential to increasing my usage)

| CHANGES/RESOURCES NEEDED TO EXPAND USE OF COMPUTERS IN YOUR INDUSTRIAL ARTS CLASSES | Responses NI 1 | SI 2 | MI 3 | VI 4 |
|---|---|---|---|---|
| 24. Additional computers and peripheral equipment. . . | 1 | 2 | 3 | 4 |
| 25. Additional funds . . . . . | 1 | 2 | 3 | 4 |
| 26. Software (programs) designed for industrial arts . | 1 | 2 | 3 | 4 |
| 27. User's group or clearinghouse of software for industrial arts courses (i.e., source of information on available software and ideas for software dev.) | 1 | 2 | 3 | 4 |
| 28. Time--to develop software for our courses. . . . . | 1 | 2 | 3 | 4 |
| 29. Time--additional time to plan and develop instructional materials related to computer applications. | 1 | 2 | 3 | 4 |
| 30. Appropriate courseware for computer applications (includes textbooks, student learning activities). | 1 | 2 | 3 | 4 |
| 31. Curriculum guide(s) that would describe how computers fit into the industrial arts curriculum. . . . . | 1 | 2 | 3 | 4 |
| 32. Technical assistance--access to someone who could answer my questions when I run into a problem. . . | 1 | 2 | 3 | 4 |
| 33. Appropriate space to house computers in our lab/shop. | 1 | 2 | 3 | 4 |
| 34. Encouragement and support of our school administ. | 1 | 2 | 3 | 4 |
| 35. College courses that would improve my knowledge and skills for using computers . . . . . | 1 | 2 | 3 | 4 |
| 36. In-service opportunities to improve my knowledge and skills for using computers . . . . . | 1 | 2 | 3 | 4 |
| 37. Other_____ | 1 | 2 | 3 | 4 |

38. What type of computers do you use in your industrial arts classes? (Check all that apply.)

___(1) Micro-computer.
___(2) Mini-computer.
___(3) Main frame.
___(4) Time-sharing system.

39. If you are using a micro-computer, what make is it? (Check all that apply.)

___(1) Apple.
___(2) Atari.
___(3) Commodore.
___(4) IBM PC.
___(5) Radio Shack.
___(6) Zenith.
___(7) Other (please specify)_____

40. How many years have you been teaching?

___(1) This is my first year.
___(2) 1-2 years.
___(3) 3-5 years.
___(4) 6-10 years.
___(5) 11-20 years.
___(6) More than 20 years.

41. At what grade levels do you teach?

___(1) Middle school/Junior high school.
___(2) Senior high school.
___(3) Other_____.

42. What is the highest degree you hold?

___(1) Bachelor's degree.
___(2) Master's degree.
___(3) Education Specialist's degree.
___(4) Doctor's degree.
___(5) Other_____.

Thank you. Please return to: Orville Nelson
Center for VTAE
UW-Stout 218 Applied Arts Bldg.
Menomonie, WI 54751

## Industrial Arts Computer Survey

DIRECTIONS: This survey was designed so you can circle or check most of your responses. Place your responses on this survey. If you have any questions regarding this survey, please contact or call me.(715-232-1382)

A. Current Applications.

The question in this section is concerned with current applications of micro-computers in your courses.

1. To what extent do you use computers in your industrial arts classes?

____(1) None - Go to Item 17.
____(2) Slight - Used for a brief period of time in one or two courses to demonstrate applications of computers - Go to Item 2.
____(3) Moderate - Students have a chance to use a computer or terminal for two to four weeks in selected I.A. courses - Go to Item 2.
____(4) Extensive - Students use a computer or terminal for most of the school term in several of our I.A. courses - Go to Item 2.
____(5) Very Extensive - Students use a computer or terminal as a regular part of the class activities in almost all of I.A. courses - Go to Item 2.

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B. Factors That Have Encouraged Computer Usage.

Several factors that may encourage the use of computers in industrial arts courses are listed in the left column below. Circle the response that best indicates the extent to which each factor influenced your use. Use the following responses.

1 - NO = No influence  2 - SI = Some influence  3 - MI = Much influence

| FACTORS ENCOURAGING USE OF COMPUTERS | Level of Influence NO 1 | SI 2 | MI 3 |
|---|---|---|---|
| 2. Articles in professional journals . . . . . | 1 | 2 | 3 |
| 3. Availability of computer equipment in our lab/shop. | 1 | 2 | 3 |
| 4. Grant of funds from federal, state, or other agencies or organizations for computer equipment and software. | 1 | 2 | 3 |
| 5. Gift, grant, or free loan of computer equipment and software. . . . . | 1 | 2 | 3 |
| 6. Increasing use of computers in industry . . . . . | 1 | 2 | 3 |
| 7. Workshops, meetings, programs, etc. provided by our state department of education . . . . . | 1 | 2 | 3 |
| 8. Courses, workshops, or in-service provided by a college or university . . . . . | 1 | 2 | 3 |

| FACTORS ENCOURAGING USE OF COMPUTERS | Level of Influence NO 1 | SI 2 | MI 3 |
|---|---|---|---|
| 9. Encouragement from the administration of my school. | 1 | 2 | 3 |
| 10. Encouragement and help given by another industrial arts teacher. . . . . | 1 | 2 | 3 |
| 11. My interest in computers. . . . . | 1 | 2 | 3 |
| 12. My ability to write programs. . . . . | 1 | 2 | 3 |
| 13. Availability of appropriate software (programs) . . | 1 | 2 | 3 |
| 14. Student interest. . . . . | 1 | 2 | 3 |
| 15. Other_____ | 1 | 2 | 3 |
| 16. Other_____ | 1 | 2 | 3 |

C. Additional Assistance Needed to Increase the Use of Computers.

Read the statements below and indicate how important each would be to increasing the use of computers in your industrial arts classes. Use the following responses.

1 = NI = Not Important
2 = SI = Slightly Important
3 = MI = Moderately Important
4 = VI = Very Important (would be essential to increasing my usage)

| CHANGES/RESOURCES NEEDED TO EXPAND USE OF COMPUTERS IN YOUR INDUSTRIAL ARTS CLASSES | Level of Influence NI 1 | SI 2 | MI 3 | VI 4 |
|---|---|---|---|---|
| 17. Additional computers and peripheral equipment . . . | 1 | 2 | 3 | 4 |
| 18. Additional funds. . . . . | 1 | 2 | 3 | 4 |
| 19. Software (programs) designed for industrial arts. . | 1 | 2 | 3 | 4 |
| 20. User's group or clearinghouse of software for industrial arts courses (i.e., source of information on available software). . . . . | 1 | 2 | 3 | 4 |
| 21. Time--to develop software for our courses . . . . . | 1 | 2 | 3 | 4 |
| 22. Time--additional time to plan and develop instructional materials related to computer applications . | 1 | 2 | 3 | 4 |
| 23. Appropriate courseware for computer applications (includes textbooks, student workbooks, etc.) . . . | 1 | 2 | 3 | 4 |
| 24. Curriculum guide(s) that would describe how computers fit into the industrial arts curriculum . . . . . | 1 | 2 | 3 | 4 |

| CHANGES/RESOURCES NEEDED TO EXPAND USE OF COMPUTERS IN YOUR INDUSTRIAL ARTS CLASSES | Level of Influence NI 1 | SI 2 | MI 3 | VI 4 |
|---|---|---|---|---|
| 25. Technical assistance--access to someone who could answer my questions when I run into a problem . . . | 1 | 2 | 3 | 4 |
| 26. Appropriate space to house computers in our lab/shop. | 1 | 2 | 3 | 4 |
| 27. Encouragement and support of our school administration. . . . . | 1 | 2 | 3 | 4 |
| 28. College courses that would improve my knowledge and skills for using computers. . . . . | 1 | 2 | 3 | 4 |
| 29. In-service opportunities to improve my knowledge and skills for using computers. . . . . | 1 | 2 | 3 | 4 |
| 30. Other_____ | 1 | 2 | 3 | 4 |
| 31. Other_____ | 1 | 2 | 3 | 4 |

32. What type of computers do you use in your industrial arts classes? (Check all that apply.)

____(1) Micro-computer.
____(2) Mini-computer.
____(3) Main frame.
____(4) Time-sharing system.

33. If you are using a micro-computer, what make is it? (Check all that apply.)

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____(2) Atari.
____(3) Commodore.
____(4) IBM PC.
____(5) Radio Shack.
____(6) Zenith.
____(7) Other (Please specify)_____

34. At what grade levels do you teach?

____(1) Middle school/Junior high school.
____(2) Senior high school.
____(3) Other_____.

35. How many years have you been teaching?

____(1) This is my first year.
____(2) 1-2 years.
____(3) 3-5 years.
____(4) 6-10 years.
____(5) 11-20 years.
____(6) More than 20 years.

36. What is the highest degree you hold?

____(1) Bachelor's degree.
____(2) Mastor's degree.
____(3) Education Specialist's degree.
____(4) Doctor's degree.
____(5) Other_____

Thank you. Please return to: Orville Nelson/Center for VTAE
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